Claim Amendments

1. (currently amended) An analog computer controlled by an auxiliary digital computer for solving ~~Laplacian~~ partial differential equations by the finite difference method comprised of:

a plurality of digital programmable switching devices having similar parasitic resistances that are connected to each other in a resistive grid having nodal points, said plurality of digital programmable switching devices also including externally accessible pins;

one or more analog-to-digital converters having inputs selectively connectable to ~~selected~~ said nodal points, ~~whereby nodal point voltages may be read out~~ wherein voltage readings from said nodal points are readable through said analog-to-digital converters via said auxiliary digital computer, and wherein said auxiliary digital computer is connected to outputs associated with said one or more analog-to-digital converters; and

~~externally accessible pins connected to said digital programmable switching devices, whereby~~ one or more digital-to-analog converters ~~can~~ including outputs that are adapted to inject voltages via connection of said one or more digital-to-analog converters to said externally accessible pins, wherein said voltages ~~corresponding to Dirichlet boundary conditions~~ are presented to said externally accessible pins via said auxiliary digital computer through its connection to inputs associated with said one or more digital-to-analog converters, and wherein said voltages correspond to Dirichlet boundary conditions.

2. (original) The analog computer of claim 1 wherein said digital programmable devices are field programmable interconnect devices, in which the terminal-to-terminal connection relationship is arbitrarily definable under program control.

3. (currently amended) ~~An expanded version of the~~ The analog computer of claim 2, wherein a large ~~Laplacian~~ partial differential equation problem to be solved is partitioned in sub-problems, ~~each sub-problem being large enough to implement in the claim 2 equation solver,~~ where a solution to the ~~total~~ large partial differential equation problem is effected by using a combination of known Dirichlet boundary conditions ~~corresponding to those in the~~ provided from a problem specification and unknown Dirichlet boundary conditions ~~that are~~ supplied through computation by said computer based on measurements from ~~partial computational results directly measured at the~~ appropriate nodal points ~~generated in~~ based on one or more of the sub-problems, and ~~where~~ the solution of the large partial differential equation problem is completed by iteratively solving the sub-problems in rotation, which produces eventual convergence.

4. (currently amended) ~~An expanded analog computer controlled by an auxiliary digital computer~~ A system for solving ~~Laplacian~~ partial differential equations by the finite difference method, said system comprised of:

a network of two or more field programmable interconnect device (FPID) sections, each FPID section comprised of an array of FPID devices having similar parasitic resistances and ~~that are~~ connected to each other in a resistive grid ~~having~~, thereby forming nodal points;

external terminal pins connected to each FPID section~~, whereby;~~

digital-to-analog converters ~~can~~ adapted to inject voltages at said external terminal pins, wherein said voltages corresponding to Dirichlet boundary conditions and said digital-to-analog converters are controlled ~~via said~~ by an auxiliary digital computer; and

one or more analog-to-digital converters, also under the control of said auxiliary digital computer, are connectable to selected nodal points of any FPID section, whereby

nodal point voltages ~~may be read out~~ are readable via said auxiliary digital computer.

5. (currently amended) A method of solving ~~Poisson~~ problems having a partial differential equation ~~problems~~ by the finite difference method using a programmable resistive grid ~~comprised of the essentially identical parasitic resistances~~ including a network of field programmable interconnect devices (FPIDs), said programmable resistive grid having externally accessible pins and grid nodal points, ~~the method~~ comprised of:

impressing voltages from an analog voltage source onto said externally accessible pins, said voltages corresponding to Dirichlet boundary conditions; ~~and~~

measuring the voltages at grid nodal points; and

providing voltage measurements from the grid nodal points to a computer, wherein the computer is programmed to use the voltage measurements to solve the partial differential equation.

6. (new) The method of claim 5 wherein the step of impressing voltages from an analog voltage source onto said externally accessible pins further comprises providing said voltages from a digital-to-analog converter.

7. (new) The method of claim 5 wherein the step of measuring the voltages at grid nodal points further comprises measuring the voltages at said grid nodal points using a analog-to-digital converter.

8. (new) The method of claim 6 wherein the digital-to-analog converter is under the control of the computer.

9. (new) The method of claim 7 wherein analog-to-digital converter is under the control of the computer.

10. (new) The method of claim 6 wherein the step of measuring the voltages at said grid nodal points further comprises measuring the voltages at said grid nodal points using an analog-to digital converter.

11. (new) The method of claim 10 wherein the digital-to-analog and analog-to-digital converters are under the control of the computer.

12. (new) The method of claim 5 wherein:

the step of impressing the voltages from the analog voltage source onto said externally accessible pins further comprises providing the voltages from a digital-to-analog converter;

the step of measuring the voltages at said grid nodal points further comprises measuring the voltages at said grid nodal points using an analog-to digital converter; and

the digital-to-analog and analog-to-digital converters are under the control of the computer, which is programmed to carry out the steps of providing and measuring the voltages.